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ABSTRACT

The reliability, validity, and score discrepancies of 94 expository essays scored in conference versus remote settings were studied. Focus was on comparing holistic ratings obtained in both settings. Essays written by college freshmen on two different topics were scored by readers working in a conference setting and by different readers working in their own homes or offices. The conference readers were monitored by table leaders. The remote readers received only written instructions in the mail, and their scoring was not monitored. Validity was assessed via multiple correlations of two criteria. The results show that reliability comparisons favored the conference method, and that average incremental validity--the contribution of essay scores over and beyond the multiple correlation using multiple-choice scores--was 0.06 for conference scoring and 0.05 for remote scoring. The remote scores were statistically calibrated by adjusting scores for reader tendencies; these calibrations reduced score discrepancies and slightly increased reliability and validity. Remote scoring is currently not as effective as is conference scoring. However, if more sophisticated calibration procedures can be developed and if reader monitoring can be improved, remote scoring could prove effective. Also, cost and convenience may require use of remote scoring. A chart and 18 data tables are provided. Sample communications to readers, scoring guides and instructions on two topics, the score record sheet, an outline of the analysis of variance model and reliability estimation procedure, and the original and calibrated scores are appended. (TJH)

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College Board Report

No. 88-3

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Hunter M. Breland
Robert J. Jones

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College Entrance Examination Board, New York, 1988

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ABSTRACT

Essays written by college freshmen on two different topics were scored first by readers working in a conference setting and second by another set of readers working in their own homes or offices. The conference readers were trained in the standard manner on the specific topics to be scored and were monitored by table leaders, as is done in standard scoring procedures. The remote readers received only written instructions in the mail and there was no monitoring of their scoring. Analyses of the reliability and validity of the two scoring methods were then conducted.

Reliability comparisons favored the conference method over the remote method (.75 for conference scoring versus an average of .62 for remote scoring of two essays by three readers). Validity was assessed through multiple correlations with two criteria: (1) a four-essay criterion, with each essay scored by three readers different from those who scored the essays being examined, and (2) freshman English course grade. The conference scores yielded a slightly higher average multiple correlation with the four-essay criterion than did the remote scores (.67 versus .63), but for the English course grade criterion the average multiple correlation was the same for both types of scoring (.50). Average incremental validity (the contribution of essay score over and beyond the multiple correlation using multiple-choice scores—TSWE and ECT) was .06 for the conference scoring and .05 for the remote scoring when the four-essay criterion was used.

The remote scores were also statistically calibrated by adjusting scores for reader tendencies. These calibrations were effective in reducing score discrepancies, and reliabilities and validities were increased slightly as a result of the calibrations.

The comparisons conducted suggest some promise for remote scoring, especially if more sophisticated calibration procedures can be developed and if improved reader monitoring can be implemented, but with current procedures remote scoring is not as effective as conference scoring. Under certain circumstances, however, where cost or convenience may be relatively more important than reliability and validity, remote scoring may be preferable to conference scoring.

INTRODUCTION

This study compared the reliability, validity, and score discrepancies of expository essays scored in conference as opposed to remote settings. The conference is the most commonly used setting for scoring essays because it affords an opportunity for readers to discuss their scoring experiences while they are in the process of scoring. It also allows for training and practice in a face-to-face situation and for monitoring of the scoring by experienced table leaders. These advantages of conference scoring are well known.

Remote scoring, in which each reader scores in his or her own office or home, is often used to complete scoring for a small number of essays that for one reason or another were not scored during a regular conference scoring session. These "mop-up" readings are conducted through the mail and are acceptable because the number of scores produced in this way represents a very small proportion of the total and because the readers were trained for scoring this same essay topic as a part of the regular conference reading.

The remote scoring examined in this study was different from that conducted for "mop-up" readings because the readers had not been trained previously for scoring of the particular essay topics involved. Rather, they were sent instructions in the mail along with the essays to be scored and were asked to mail back the scores. There was thus no opportunity to discuss the scoring with other readers nor for the monitoring done by table leaders.

Remote scoring is potentially important because of recent advances in telecommunications that allow for scoring, and even instruction, by means of telephone/computer stations in homes and offices. Because of these advances, it is not necessary to travel to some central location to exchange information. At issue, however, is whether readers can function adequately in a remote environment so as to produce reliable and valid scores, as well as scores that do not require excessive adjudication of score discrepancies. It was the purpose of this project to examine that question.

In a previous study of remote scoring (Breland et al. 1984), reliabilities and validities of conference and remote essay scores were also compared. In that study, reading reliabilities obtained for remote scores were higher than the reading reliabilities obtained for regular ECT administration conference scores (.78 versus .74), and validities based on correlations with self-reported high school English grades were also higher for the remote scores (.26 versus .20). However, the remote scoring procedure used required three focused ratings that were then combined for a composite score. These focused ratings were not used in the present investigation. The primary objective of the present investigation was to compare holistic ratings obtained in both conference and remote settings. A secondary objective was to examine the effects of reader calibration using a method developed by Braun (1986).

DESCRIPTION OF THE STUDY

The original essay scoring design is shown in Chart 1. There were a total of 267 students, and each student had written six essays. Two essays were written in each of three different modes: narrative, expository, and per-

suasive. Within each mode there were two different topics. Nine readers conducted the scoring, and three readers were assigned to each of the three modes. Thus, within each mode, all readers read and scored all essays.

The present investigation was limited to the expository mode and to a sample of 94 cases for which all important variables were available for analysis. The expository mode was the most appropriate to use because expository essays are the type most often scored for national administrations, and as a result there exist many readers trained in scoring this type of essay. Since no specific training was to be provided for the particular essay topics to be scored remotely, it was considered important that readers be experienced with the general type of essay to be scored. From lists of readers experienced in the scoring of expository essays, nine were selected to conduct the remote scoring. In selecting readers, an attempt was made to obtain a geographical spread by selecting no more than one reader from a given state. Additionally, any reader who had experienced difficulties in a conference reading was avoided. The readers chosen were otherwise selected more or less at random from lists of experienced readers.

Essay Packet Preparation

The essays to be scored were carefully printed for legibility. They were then scrambled in random order so that no reader would read them in the same order. A scoring sheet was prepared on which readers were instructed to enter their scores in the order the essays were read. Each packet included a scoring guide as part of the instructions and a set of six sample scored essays, one for each score level. The sample scored essays had been selected from the cases remaining from the original study after the 94 cases for remote scoring had been removed.

Reader Instructions

Readers were instructed to study the scoring guide and to try it out using the sample scored essay prior to scoring the essay packet. Rough guidelines were given for distribution of scores among the six score levels. Finally, the readers were advised to read at whatever pace they chose and to schedule the reading so as to be convenient. (See Appendixes A through D for more details of the scoring instructions.)

Reader Feedback

Following the return of the first packet (first topic) of essays and the scoring sheet, a distribution of reader scores was tallied. This distribution was returned to readers along with the second packet (second topic) with instructions to compare their score distribution with those of the other eight readers. Some minor revisions of the scoring guide, based on reader commentaries, were made and the revised scoring guide was sent with the second batch of essays.

Reader Payment

Readers were paid $200 for scoring the two essay topics, or roughly $100 for each of two days of work (though 94 essays would not normally be considered a full day's work). The study of the scoring instructions and practice with the scoring guide and the sample essays, a sort of self-training, required time beyond that usually required. Moreover, an intent in the remote scoring was to allow readers the leisure of their own homes or offices as one means of compensating for the lack of discussion with other readers and consultation with table leaders.

DISTRIBUTION OF CONFERENCE AND REMOTE READER SCORES

Table 1 gives the distribution of scores assigned by the conference and remote readers to the two expository essays. It is clear that the conference readers tended to assign more scores in the middle range, especially scores of "4," and the remote readers tended to spread scores out more. The remote reader score distribution suggests that these readers were influenced by feedback on their distributions from the first essay prior to scoring the second essay. Note that Readers 8 and 9 assigned 12 and 13 scores of 6 for the first essay, but reduced these high scores dramatically for the second essay.

The means and standard deviations of reader scores, given in Table 2, summarize the score distributions. The average scores assigned are quite close and the standard deviations show, as did the distributions, that the remote readers tended to spread scores out slightly more—especially for the second essay.

RELIABILITY OF CONFERENCE AND REMOTE READER SCORES

Reading reliability, as indicated by interreader score correlations, suggests a slight advantage for the conference scoring. Table 3 shows interreader correlations for conference scores, and Tables 4 and 5 show these for remote scores. Table 6 summarizes these interreader correlations as averages for comparison. Reading reliabilities for the second expository essay were less than those for the first expository essay for both types of scoring. But

the reading reliability of the conference scoring of the first expository essay (.648) is higher than that of remote scoring (.621). Similarily, the reading reliability of the conference scoring of the second expository essay (.540) is higher than that for remote scoring (.525).

Reliability is more accurately assessed by considering more than one essay topic in its estimation, since error in the assessment can result from the topic assigned as well as from reader inconsistency. Topic error arises because some students can write well on one topic but not on another. Reliability for multiple topics is best examined through analysis of variance. An analysis of variance model for the scoring design used in this study is given in Appendix E, along with a formula for estimating reliability from variance components and analysis of variance results. Variance components in some instances were small negative values, indicating that all assumptions of least squares analysis of variance were not met. These small negative values were replaced with zeros for reliability estimation. The reliability estimates obtained for three different sets of remote readers (1–3, 4–6, and 7–9) were .69, .55, and .61, respectively. None of these three sets equaled the reliability of the original set of three conference readers, which was .75 (see Breland et al., page 26).

The variance components show that the primary source of error in both the conference and remote scorings is the subject by topic interaction, although its influence was much greater in the remote scoring. In the conference scoring, both the subjects by topic interaction and the subjects by reader interaction were substantial. In contrast, the subjects by reader interaction for the remote scoring was much less important than the subjects by topic interaction. Finally, there was much more unexplained error variation in the remote scoring than in the conference scoring as indicated by the error term. The total score reliabilities suggest—as did the reader reliabilities, discussed previously—that the remote scoring was not as reliable as the conference scoring.

VALIDITY OF CONFERENCE AND REMOTE READER SCORES

To examine the validity of the two different types of scores, two criteria were used. The first criterion was a four-essay measure derived from two types of essays (narrative and persuasive) used in the original study. Each of the four essays—two narrative and two persuasive—were scored independently by three different readers in a conference setting. The persuasive essays were begun in class, discussed with peers, and then completed at home. All of these essays were on topics completely different from the expository essays, and they were scored by different readers. The second criterion was the course grade in freshman English received by each student.

Table 7 presents comparative correlations with the first criterion. As for the reliabilities, the average validities for this essay criterion are slightly higher for the conference scoring. Some of the remote readers, however, had higher validities than some of the conference readers. Remote Reader 4 had a validity of .6118 for the first expository essay (higher than two of the three conference readers), and Reader 7 had a higher validity for the second expository essay than any of the conference readers. But validities varied somewhat for individual readers for the first and second essays. Remote Reader 4, for example, who had the highest validity for the first essay (.6118), had the lowest validity for the second essay (.3874).

Because of these variations across essays, the best measure of a reader's overall performance is to examine scores on both essays as predictors of the criterion. Table 8 gives multiple correlations of each reader's two scores (one for the first expository esssay and one for the second) as predictors of the independent four-essay criterion. In this comparison, Conference Reader 2 excelled with a validity of .7143, but Remote Readers 4 and 7 had higher validities (.6784 and .6867) than either of the other two conference readers (.6616 and .6265). Overall, the average of the conference validities (.6675) was slightly greater than the average of the remote validities (.6314).

Table 9 gives multiple correlations for the prediction of freshman English course grade for conference and remote scores. The average multiple R for conference and remote readings is quite close (.5010 versus .4959), and if one remote reader (Reader 9) is eliminated, the remote average is slightly higher (.5079) than the conference average.

COMBINED PREDICTION USING MULTIPLE-CHOICE SCORES

Usually it is not necessary to rely on essay scores alone because other measures are available for the same students. In the data base for the present study were SAT scores, TSWE scores, and ECT scores. It is useful to consider what difference there is in the overall predictive accuracy possible when these predictors are used in combination with either conference or remote essay scores. Table 10 shows predictions of the four-essay criterion possible using various predictor sets based on different pairings of conference readers (since two readers and one essay represent the most common form of assessment). The conference essay score pairs yield an incremental validity of about .07 points in the multiple correlation, on the average.

Table 11 shows a similar analysis for the remote

scores of the first expository essay. Since there were nine different readers, and since pairs of readers are examined, a total of 36 pairs are possible. The incremental validities for the remote reader pairs are not substantially different from those for the conference reader pairs in Table 10, but some reader pairs were clearly less effective than others (e.g., R3 and R9, R6 and R9).

Table 12 shows the multiple correlations for multiple-choice tests used in combination with Expository 2 remote reader pair scores. The incremental validities for reader pairs based on the second expository essay are higher than those for the first. And many of the reader pair increments are greater than those for the conference scoring in Table 10. Twelve of the reader pair increments exceed .08, whereas none of the conference reader pairs attained an incremental validity of .08.

Table 13 examines the question of whether it is better to use two essays, with each scored by a different reader, than to use one essay scored by two readers. From the perspective of validity, and ignoring the additional effort and student time required to administer two essays, it would be better to use two essays. The average essay increment in Table 13 (.0847) is slightly larger than that presented previously for conference scores (.0741) in Table 10. Whether the validity increments are larger enough to offset the added expense and time of a second essay remains open to question.

Table 14 presents a comparison of individual reader validities and their validity increments over that obtainable with TSWE and ECT. The SAT-V score is excluded from this analysis because the question at issue is how much the reader scores add to other measures of writing ability. Since the SAT-V score assesses other abilities beyond writing, it seems appropriate to exclude it from these comparisons. An interesting aspect of Table 14 is that some readers' scores correlate well with TSWE and ECT scores, while others do not. Note that Reader 9's scores on the second expository essay hardly correlate at all with TSWE and ECT scores. Without additional information, one might conclude that Reader 9 was a poor reader. But when the multiple correlation with the four-essay criterion (NARPER) is considered, Reader 9 produces one of the highest validities. What is suggested is that Reader 9 was scoring for writing skills beyond grammar and sentence structure and thus adding more to the overall assessment than most other readers.

STATISTICAL CALIBRATION OF SCORES

In an actual remote reading, given the difficulty of reader monitoring, it would be advisable to control reader error as much as possible. One way of doing this is through reader calibration or score adjustment for individual reader scoring tendencies. Therefore, to develop an additional comparison, the remote reader scores were calibrated statistically, using a method developed by Braun (1986). In this method, reader scores are adjusted by computing the mean across all readers and then computing a reader effect as the difference between each reader's mean score and the mean score for all readers. The reader effects are then reversed in sign and used to adjust each reader's scores up or down. That is, for example, a lenient reader with a positive effect would have all scores reduced by the amount of that effect. The matrix of scores for both original and calibrated scores is included as Appendix F.

To examine the effects of calibration, random selection of remote reader pairs was made from the nine total readers for each case. This process was repeated five times. That is, for each of the 94 cases of data, two reader scores were randomly selected from the nine available scores, a procedure repeated five times using five different sets of random numbers. Analyses were then made of discrepancies between the two scores, correlations between the two scores, and validities of the score pairs for predicting the four-essay score criterion and freshman English course grade.

Table 15 presents a comparison of score discrepancies observed for conference, remote, and calibrated remote scores. A discrepancy was defined as a score difference of 2 or more score points on the 1-to-6 scale used for all scorings. On the average, 8.3 percent of the conference scores, 12.8 percent of the remote scores, and 4.2 percent of the calibrated remote scores were discrepant by this standard. These would be the essays requiring adjudication if this standard were used. The calibrated remote scores would clearly require the least effort for adjudication.

Results of the correlational analyses are given in Table 16. Here it is seen that the calibrated remote score pairs correlate about as well as the conference score pairs (.6485 average versus .6426 average) for the first expository essay but not quite as well for the second expository essay (.5501 average versus .5072 average). These score pair correlations represent an estimate of reader reliability.

Results of the four-essay criterion validity comparisons are given in Table 17. The remote and calibrated remote scores correlated represent the five pairs of randomly selected scores. The first and second random scores are the first pair, the third and fourth the second pair, and so on. The correlations were then averaged for comparison with the original conference score correlations. These results show that neither the remote scores nor the calibrated remote scores resulted in correlations with the four-essay criterion that were as high as those obtained with the original conference scores.

Results of the freshman course grade validity comparisons are given in Table 18. Here, for the first expository essay, the calibrated remote score average cor-

relation is equivalent to the original conference score average correlation (.4661). However, for the second expository essay, the calibrated remote score average correlation is somewhat less than the average correlation obtained with the original conference scores (.3430 versus .4200).

CONCLUSIONS

These results suggest that calibrated remote scores offer promise but that they cannot be considered equivalent to conference scores in terms of either reliability or validity. On the other hand, score discrepancies—and thus the need for adjudication—can be substantially decreased through calibration. An operational implication of these analyses, nevertheless, is that calibrated remote scores might be used in conjunction with score adjudications made in a conference setting. Calibrated remote scores could be analyzed for discrepancies and then rescored in a conference setting if discrepancies exceeded some standard. Since only a small proportion of scores are highly discrepant (only 4 percent in the sample studied here), the large majority of essays could be scored remotely, using electronic communications if that turns out to be technologically practical. The costs of essay scoring could be reduced substantially using remote scoring, electronic or not. Estimates suggest that remote scoring, including printing costs, postage, and clerical work, can be conducted at approximately half the cost of traditional conference scoring. If only a small proportion of essays required adjudication in a conference setting, essay scoring costs would be much less than for scoring entire administrations in the conference mode.

If the essay is viewed as only one component of the assessment, then it is its incremental contribution to the overall assessment that is most important. Incremental validities over and beyond what is obtainable with other available measures were not found to be large—about .06 points for conference scoring on the average and about .05 points for remote scoring on the average. From this perspective, therefore, the advantages of conference scoring over remote scoring are minimal.

It is quite possible that methods of feedback and statistical calibration of reader scores can be improved over what was used for this study. Certainly the limited feedback used (comparative score distributions with other readers at the midpoint of the scoring session) could be improved and increased in frequency. In an actual telecommunications setting it would be possible to provide very frequent feedback to readers. Thus remote scoring through telecommunications would appear to be a distinct possibility.

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Chart 1. Design for Holistic Essay Scoring

	Narrative mode						*Expository mode*						*Persuasive mode*					
Students	*Topic 1*			*Topic 2*			*Topic 3*			*Topic 4*			*Topic 5*			*Topic 6*		
	Readers						*Readers*						*Readers*					
S1	R1	R2	R3	R1	R2	R3	R4	R5	R6	R4	R5	R6	R7	R8	R9	R7	R8	R9
S2	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
S3	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
•	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
•	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
•	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
•	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
•	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
•	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
S267	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"

Table 1. Distribution of Conference and Remote Reader Scores

Scoring type	*Essay/ score*	*Percentage distribution of scores by conference and remote reader number*									*Average percentage*
		1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	
Conference	*Expository 1*										
	1	4	3	4							4
	2	9	9	7							8
	3	23	18	21							21
	4	44	48	43							45
	5	15	19	18							17
	6	5	3	6							5
	Expository 2										
	1	2	2	1							2
	2	7	5	6							6
	3	26	26	29							27
	4	45	45	48							46
	5	16	20	11							16
	6	4	2	5							4
Remote	*Expository 1*										
	1	5	4	2	5	4	0	5	1	2	3
	2	14	9	9	13	18	5	5	5	4	9
	3	19	30	23	21	27	21	29	16	13	22
	4	43	32	46	43	36	44	45	39	44	41
	5	15	16	15	14	13	21	12	27	24	17
	6	4	9	5	4	2	9	4	12	13	7
	Expository 2										
	1	3	2	6	3	3	2	2	4	9	4
	2	9	7	9	5	9	6	9	12	9	8
	3	30	26	24	26	24	29	26	26	26	26
	4	39	37	41	43	44	40	41	39	35	40
	5	15	22	15	18	15	17	17	17	15	17
	6	4	5	4	5	5	5	5	3	6	5

Table 2. Mean and Standard Deviations of Conference and Remote Reader Scores

Score	*Mean*	*Standard deviation*
Conference Readers		
Expository 1, Reader 1	3.723	1.121
Expository 1, Reader 2	3.809	1.050
Expository 1, Reader 3	3.819	1.145
Expository 2, Reader 1	3.777	1.018
Expository 2, Reader 2	3.819	0.961
Expository 2, Reader 3	3.766	0.955
Remote Readers		
Expository 1, Reader 1	3.606	1.184
Expository 1, Reader 2	3.766	1.213
Expository 1, Reader 3	3.787	1.046
Expository 1, Reader 4	3.596	1.167
Expository 1, Reader 5	3.415	1.121
Expository 1, Reader 6	4.064	0.993
Expository 1, Reader 7	3.649	1.075
Expository 1, Reader 8	4.202	1.083
Expository 1, Reader 9	4.223	1.099
Expository 2, Reader 1	3.670	1.072
Expository 2, Reader 2	3.862	1.084
Expository 2, Reader 3	3.617	1.156
Expository 2, Reader 4	3.830	1.064
Expository 2, Reader 5	3.745	1.087
Expository 2, Reader 6	3.798	1.043
Expository 2, Reader 7	3.787	1.066
Expository 2, Reader 8	3.606	1.119
Expository 2, Reader 9	3.585	1.273
Conference Averages		
Expository 1	3.784	1.105
Expository 2	3.787	0.978
Remote Averages		
Expository 1	3.812	1.109
Expository 2	3.722	1.107

Table 3. Interreader Score Correlations for Conference Scoring

	Expository 1			*Expository 2*		
	R1	*R2*	*R3*	*R1*	*R2*	*R3*
Expository 1						
R1	1.0					
R2	.6306	1.0				
R3	.6645	.6505	1.0			
Expository 2						
R1	.5392	.4626	.3710	1.0		
R2	.4022	.5193	.3705	.5519	1.0	
R3	.6219	.5766	.6688	.5762	.4921	1.0

Note: Average interreader correlation = .6485 (for Expository 1) and .5401 (for Expository 2).

Table 4. Remote Interreader Correlations for First Expository Essay

	R1	*R2*	*R3*	*R4*	*R5*	*R6*	*R7*	*R8*	*R9*
R1	1.0								
R2	.6313	1.0							
R3	.6695	.5875	1.0						
R4	.5994	.6541	.5807	1.0					
R5	.6914	.6416	.6815	.6311	1.0				
R6	.5613	.6556	.5622	.5331	.6622	1.0			
R7	.6084	.6209	.5833	.5887	.6311	.6160	1.0		
R8	.7080	.6664	.7405	.6012	.6829	.6278	.6619	1.0	
R9	.6301	.5801	.5844	.5324	.6049	.5586	.6225	.5668	1.0

Note: Average interreader correlation = .6210.

Table 5. Remote Interreader Correlations for Second Expository Essay

	R1	*R2*	*R3*	*R4*	*R5*	*R6*	*R7*	*R8*	*R9*
R1	1.0								
R2	.6641	1.0							
R3	.5742	.5068	1.0						
R4	.5444	.6415	.3837	1.0					
R5	.4993	.5814	.4435	.6129	1.0				
R6	.3246	.5078	.3276	.3950	.5326	1.0			
R7	.4649	.5326	.5178	.4701	.6670	.5604	1.0		
R8	.6260	.5931	.5640	.5121	.5973	.5576	.6320	1.0	
R9	.4660	.5190	.4023	.5505	.5441	.5029	.5678	.5029	1.0

Note: Average interreader correlation = .5247.

Table 6. Comparison of Reader Reliabilities for Conference and Remote Scorings

Essay topic	*Reading mode*	*Average interreader correlation*
Expository 1	Conference	.648
Expository 1	Remote	.621
Expository 2	Conference	.540
Expository 2	Remote	.525

Table 7. Prediction of Four-Essay Criterion Score Using Conference and Remote Reader Scores

Scoring type	*Essay reader*	*Correlation with Narrative + Persuasive** r	*Average r*
Conference	*Expository 1*		
	Reader 1	.6098	.6202
	Reader 2	.6618	
	Reader 3	.5890	
	Expository 2		
	Reader 1	.5449	.5570
	Reader 2	.5734	
	Reader 3	.5526	
Remote	*Expository 1*		
	Reader 1	.4896	.5422
	Reader 2	.5776	
	Reader 3	.5221	
	Reader 4	.6118	
	Reader 5	.5722	
	Reader 6	.5461	
	Reader 7	.5364	
	Reader 8	.6028	
	Reader 9	.4217	
	Expository 2		
	Reader 1	.5280	.4985
	Reader 2	.4598	
	Reader 3	.5363	
	Reader 4	.3874	
	Reader 5	.5177	
	Reader 6	.4646	
	Reader 7	.6119	
	Reader 8	.5690	
	Reader 9	.4115	

*The Narrative and Persuasive scores are each the sum of three conference scores assigned by readers different from either the expository conference scores or the expository remote scores.

Table 8. Multiple Correlations Predicting Narrative + Persuasive Using Conference and Remote Reader Scores

Scoring type	*Reader*	*R**	*Average R*
Conference	1	.6616	.6675
	2	.7143	
	3	.6265	
Remote	1	.6155	.6314
	2	.6150	
	3	.6259	
	4	.6784	
	5	.6519	
	6	.6114	
	7	.6867	
	8	.6512	
	9	.5367	

*R = multiple correlation.

Table 9. Multiple Correlations Predicting Course Grade Using Conference and Remote Reader Scores

Scoring type	*Reader*	*R*	*Average R*
Conference	1	.4434	.5010
	2	.4994	
	3	.5602	
Remote	1	.4912	.4959*
	2	.4560	
	3	.5381	
	4	.4868	
	5	.5478	
	6	.4773	
	7	.5392	
	8	.5271	
	9	.3996	

*Excluding Remote Reader 9, average R = .5079.

Table 10. Multiple Correlations Predicting Narrative + Persuasive from Combinations of Multiple-Choice Scores and Conference Reader Score Pairs

*Predictor set**	*R*	*Essay increment***	*Predictor set**	*R*	*Essay increment***
SAT-V TSWE ECT EX1R1 EX1R2	.7914	.0845	SAT-V TSWE ECT EX2R1 EX2R2	.7695	.0626
SAT-V TSWE ECT EX1R1 EX1R3	.7854	.0785	SAT-V TSWE ECT EX2R1 EX2R3	.7667	.07667
SAT-V TSWE ECT EX1R2 EX1R3	.7981	.0912	SAT-V TSWE ECT EX2R2 EX2R3	.7748	.0679

*For SAT-V, TSWE, and ECT alone, R = .7069.
**The average essay increment = .0741.

Table 11. Multiple Correlations Predicting Narrative + Persuasive from Combinations of Multiple-Choice Scores and Remote Reader Score Pairs for Expository 1*

Reader pair	*R*	*Reader pair increment*	*Reader pair*	*R*	*Reader pair increment*
R1,R2	.7564	.0495	R3,R7	.7694	.0625
R1,R3	.7469	.0400	R3,R8	.7596	.0527
R1,R4	.7658	.0589	R3,R9	.7460	.0391
R1,R5	.7641	.0572	R4,R5	.7791	.0722
R1,R6	.7531	.0462	R4,R6	.7747	.0678
R1,R7	.7660	.0591	R4,R7	.7800	.0731
R1,R8	.7584	.0515	R4,R8	.7774	.0705
R1,R9	.7409	.0340	R4,R9	.7649	.0580
R2,R3	.7608	.0539	R5,R6	.7679	.0610
R2,R4	.7723	.0654	R5,R7	.7789	.0720
R2,R5	.7727	.0658	R5,R8	.7736	.0667
R2,R6	.7602	.0533	R5,R9	.7643	.0574
R2,R7	.7727	.0658	R6,R7	.7690	.0621
R2,R8	.7675	.0606	R6,R8	.7650	.0581
R2,R9	.7552	.0483	R6,R9	.7489	.0420
R3,R4	.7686	.0617	R7,R8	.7742	.0673
R3,R5	.7660	.0591	R7,R9	.7639	.0570
R3,R6	.7563	.0494	R8,R9	.7597	.0528

*The multiple-choice scores were SAT-V, TSWE, and ECT. For these three variables alone, R = .7069.

Table 12. Multiple Correlations Predicting Narrative + Persuasive from Combinations of Multiple-Choice Scores and Remote Reader Score Pairs for Expository 2*

Reader pair	*R*	*Reader pair increment*	*Reader pair*	*R*	*Reader pair increment*
R1,R2	.7545	.0476	R3,R7	.7966	.0897
R1,R3	.7656	.0587	R3,R8	.7779	.0710
R1,R4	.7517	.0448	R3,R9	.7897	.0828
R1,R5	.7839	.0770	R4,R5	.7743	.0674
R1,R6	.7668	.0599	R4,R6	.7470	.0402
R1,R7	.7973	.0904	R4,R7	.7869	.0800
R1,R8	.7714	.0645	R4,R8	.7662	.0593
R1,R9	.7573	.0504	R4,R9	.7748	.0679
R2,R3	.7642	.0573	R5,R6	.7774	.0705
R2,R4	.7438	.0369	R5,R7	.7964	.0895
R2,R5	.7774	.0705	R5,R8	.7876	.0807
R2,R6	.7527	.0458	R5,R9	.7943	.0874
R2,R7	.7895	.0826	R6,R7	.7874	.0805
R2,R8	.7692	.0623	R6,R8	.7688	.0619
R2,R9	.7785	.0716	R6,R9	.7772	.0703
R3,R4	.7606	.0537	R7,R8	.7951	.0882
R3,R5	.7906	.0837	R7,R9	.7996	.0927
R3,R6	.7707	.0638	R8,R9	.7901	.0832

*The multiple-choice scores were SAT-V, TSWE, and ECT. For these three variables alone, R = .7069.

Table 13. Multiple Correlations Predicting Narrative + Persuasive from Combinations of Multiple-Choice Scores and Two Topic Scores (each read by a different conference reader)*

Predictor set	*R*	*Essay increment***	*Predictor set*	*R*	*Essay increment***
SAT-V TSWE ECT EX1R1 EX2R2	.7890	.0821	SAT-V TSWE ECT EX2R1 EX1R2	.7963	.0894
SAT-V TSWE ECT EX1R1 EX2R3	.7715	.0646	SAT-V TSWE ECT EX2R1 EX1R3	.7989	.0920
SAT-V TSWE ECT EX1R2 EX2R3	.7898	.0829	SAT-V TSWE ECT EX2R2 EX1R3	.8042	.0973

*The multiple-choice scores are SAT-V, TSWE, and ECT. For these three variables alone, R = .7069.
**The average essay increment = .0847.

Table 14. Reader Contribution to Prediction of Narrative + Persuasive

	r with		*R for predicting with:*	
	TSWE	*ECT*	*(Essay + TSWE + ECT)*	*Essay increment**
Conference Readings				
EX1R1	.5331	.4742	.7588	.05
EX1R2	.5561	.4838	.7790	.07
EX1R3	.4149	.3782	.7772	.07
EX2R1	.4505	.4192	.7494	.04
EX2R2	.4687	.4713	.7540	.05
EX2R3	.4589	.4056	.7522	.05
				.06**
Remote Readings				
REX1R1	.4224	.3951	.7359	.03
REX1R2	.4870	.4846	.7519	.05
REX1R3	.4670	.3930	.7410	.04
REX1R4	.4968	.5346	.7619	.06
REX1R5	.4390	.4053	.7633	.06
REX1R6	.4645	.4764	.7440	.04
REX1R7	.3883	.3282	.7633	.06
REX1R8	.5467	.4471	.7568	.05
REX1R9	.3500	.3054	.7306	.02
				.05**
REX2R1	.4385	.3867	.7359	.03
REX2R2	.3494	.3149	.7417	.04
REX2R3	.4386	.3590	.7590	.05
REX2R4	.3187	.2648	.7277	.02
REX2R5	.3109	.2635	.7742	.07
REX2R6	.3651	.3689	.7376	.03
REX2R7	.4258	.3867	.7852	.08
REX2R8	.4405	.3782	.7641	.06
REX2R9	.1510	.0955	.7745	.07
				.05**

*The multiple correlation of TSWE and ECT with Narrative + Persuasive = .7057.
**Average increment.

Table 15. Comparisons of Score Discrepancies for Conference, Remote, and Calibrated Remote Scorings

Score difference	*No. of discrepancies of 2 or more score points*	*% of discrepancies of 2 or more score points*
Conference Score Diff.		
Reader 1–Reader 2	8	8
Reader 1–Reader 3	6	6
Reader 2–Reader 3	10	11
Average	8.0	8.3
Remote Score Diff.		
Random A–Random B	8	8
Random C–Random D	15	16
Random E–Random F	12	13
Random G–Random H	9	10
Random I–Random J	16	17
Average	12.0	12.8
Calibrated Remote Diff.		
Random A–Random B	2	2
Random C–Random D	3	3
Random E–Random F	7	7
Random G–Random H	2	2
Random I–Random J	7	7
Average	4.2	4.2

Table 16. Correlations between Pairs of Reader Scores for Conference, Remote, and Calibrated Remote Scorings

	r	
Reader Pair	*Expository 1*	*Expository 2*
Conference Scoring		
R1, R2	.6306	.5519
R1, R3	.6645	.5762
R2, R3	.6505	.4921
Average	.6485	.5501
Remote Scoring		
First Random Pair	.6521	.4685
Second Random Pair	.6153	.4212
Third Random Pair	.5613	.5925
Fourth Random Pair	.5758	.5262
Fifth Random Pair	.5381	.4853
Average	.5885	.4987
Calibrated Remote Scoring		
First Random Pair	.6953	.4826
Second Random Pair	.6799	.4275
Third Random Pair	.6197	.6073
Fourth Random Pair	.6602	.5280
Fifth Random Pair	.5580	.4908
Average	.6426	.5072

Table 17. Validity of Conference, Remote, and Calibrated Remote Essay Scores Using a Four-Essay Criterion

	r	
Scores	*Expository 1*	*Expository 2*
Conference Scores		
Reader 1	.6098	.5449
Reader 2	.6618	.5734
Reader 3	.5890	.5526
Average	.6202	.5570
Remote Scores		
First Random Score	.5485	.5542
Second Random Score	.5863	.3719
Third Random Score	.6258	.4440
Fourth Random Score	.5862	.5279
Fifth Random Score	.5011	.4267
Sixth Random Score	.5437	.5517
Seventh Random Score	.4647	.5714
Eighth Random Score	.5437	.4962
Ninth Random Score	.5733	.4627
Tenth Random Score	.5642	.5307
Average	.5538	.4937
Calibrated Remote Scores		
First Random Score	.5867	.5550
Second Random Score	.5779	.3802
Third Random Score	.6068	.4596
Fourth Random Score	.5334	.5037
Fifth Random Score	.4655	.4402
Sixth Random Score	.6001	.5400
Seventh Random Score	.4799	.5715
Eighth Random Score	.5502	.4988
Ninth Random Score	.6028	.4443
Tenth Random Score	.5917	.5215
Average	.5595	.4915

Table 18. Validity of Conference, Remote, and Calibrated Remote Essay Scores Using Freshman English Course Grade as Criterion

	r	
Score type	*Expository 1*	*Expository 2*
Conference Scores		
Reader 1	.4124	.3597
Reader 2	.4562	.4105
Reader 3	.5298	.4897
Average	.4661	.4200
Remote Scores		
Random A	.4662	.3893
Random B	.4940	.3638
Random C	.4190	.3817
Random D	.4408	.4186
Random E	.4312	.2633
Random F	.4873	.3376
Random G	.4042	.3260
Random H	.4873	.4143
Random I	.4779	.1837
Random J	.4349	.3767
Average	.4539	.3455
Calibrated Remote Scores		
Random A	.5024	.3833
Random B	.4958	.3680
Random C	.4432	.3806
Random D	.4207	.3955
Random E	.3533	.2923
Random F	.6119	.3311
Random G	.4115	.3249
Random H	.4698	.4201
Random I	.4995	.1657
Random J	.4543	.3690
Average	.4662	.3430

APPENDIX A. COMMUNICATIONS TO READERS

EDUCATIONAL TESTING SERVICE PRINCETON, N.J. 08541

609 921 9000
CABLE EDUCTESTSVC

December 19, 1986

Dear Professor :

Thank you for agreeing to assist us with our writing skill assessment research project. As Robert Jones has explained to you on the telephone, we will be asking you to score some expository essays over the holidays. There will be two batches (two topics) of about 90 essays each mailed at separate times. We ask that you return the first topic before we send you the second (to avoid any possible scoring bias, since the same students wrote on both topics). We expect that each topic will require four to five hours of work, including reading of scoring instructions and model papers, but you may schedule your time as you wish. You will be paid an honorarium of $200.00.

We expect to mail the first topic about December 29 by Federal Express. You should get it on December 30, and we ask that the scored papers be returned by January 15. We will then send you the second topic and ask that the scored papers be returned by January 30.

Best wishes for a happy holiday season.

Sincerely,

Hunter M. Breland
Senior Research Scientist

/njw
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EDUCATIONAL TESTING SERVICE PRINCETON, N.J. 08541

609 921 9000
CABLE EDUCTESTSVC

December 29, 1986

Dear Professor :

Enclosed are materials to be used in the essay scoring project you have agreed to help us with. Specifically, these items are enclosed:

1. A total of 94 essays written by a national sample of college freshmen.
2. The writing task students were asked to write on.
3. Instructions for scoring the essays.
4. A scoring guide.
5. Sample essays for each of the six score scale points.
6. A Holistic Score Record Sheet for recording scores.
7. An envelope for returning the Holistic Score Record Sheet, comments on the scoring guide, and the 94 essays.

Please read through the materials quickly when you receive them and inform me immediately of any missing items, confusions, etc.

We ask that you return the contract letter (which is being sent directly from our Contract Department) as soon as you receive it so that the processing of your check for $200 is not delayed. We ask that you return the completed Holistic Score Record Sheet by January 15. At that time, we will send you a second batch of essays for which we request that you return the scores by January 31.

Finally, we would very much like your comments on the Scoring Guide. After using it to assign scores to 94 essays, you will probably have some comments. Please edit the Guide as you would prefer it to be and write comments on it as well.

Best of luck and Happy New Year!

Sincerely,

Hunter M. Breland
Senior Research Scientist

EDUCATIONAL TESTING SERVICE PRINCETON, N.J. 08541

600 021 9000
CABLE EDUCTESTSVC

January 21, 1987

Dear Professor :

Thank you for your quick response on the first batch of essays. Most readers had no trouble with the scoring instructions or the Scoring Guide. Comments received suggest, however, that some readers had trouble finding enough essays at the "5" level. A few suggestions were offered about how to improve the scoring guide so that distinctions among "4's", "5's", and '6's" would be easier. We have incorporated these suggestions in a revised Scoring Guide. You will note also that we have revised the expected distribution of scores because the expectations for this second topic are slightly different from those for the first topic.

To give you an idea of how your scores compared with those of other readers, we have prepared the score distributions below and computed the average. You are reader number 9.

Percentage Distribution of Scores by Reader Number

Score	#1	#2	#3	#4	#5	#6	#7	#8	#9	Average
1	5	4	2	5	4	0	5	1	2	3
2	14	9	9	13	18	5	5	5	4	9
3	19	30	23	21	27	21	29	16	13	22
4	43	32	46	43	36	44	45	39	44	41
5	15	16	15	14	13	21	12	27	24	17
6	4	9	5	4	2	9	4	12	13	7

By comparing your percentage distribution with those for the other readers (who read the same essays that you read), you will obtain some sense of your scoring tendencies.

Our Contracts Office has informed us that the contract letters were delayed but that you will all receive them very soon. When you have signed and returned them, your checks will be sent.

We will appreciate your return of the score record sheets, the essays, and any additional comments on the Scoring Guide by February 2.

Many thanks for your help.

Sincerely,

Hunter M. Breland
Senior Research Scientist

/njw
hmb2.5
Enclosures

EDUCATIONAL TESTING SERVICE PRINCETON, N.J. 08541

609 921 9000
CABLE EDUCTESTSVC

February 1987

Dear Professor :

Thank you for the second batch of scores. Below is a tally of how your scores compared to those of other readers. You are reader number ___.

Percentage Distribution of Scores by Reader Number

Score	#1	#2	#3	#4	#5	#6	#7	#8	#9	Average
1	3	2	6	3	3	2	2	4	9	4
2	9	7	9	5	9	6	9	12	9	8
3	30	26	24	26	24	29	26	26	26	26
4	39	37	41	43	44	40	41	39	35	40
5	15	22	15	18	15	17	17	17	15	17
6	4	5	4	5	5	5	5	3	6	5

We note much more uniformity in this second batch of distributions than in the first batch. Perhaps our feedback on the first batch caused readers to adjust their scoring patterns. Or, perhaps the revisions to the scoring guide made the difference. We will be examining these and other influences on scoring and we will let you know what we learn.

Thanks again for your help.

Sincerely,

Hunter M. Breland
Senior Research Scientist

P.S. If for any reason you have not received your check for the work you have done, please inform me.

APPENDIX B. SCORING GUIDE AND INSTRUCTIONS, TOPIC 1

SCORING GUIDE

The following scoring guide is a set of generalized observations based on an analysis of the quality of writing of a set of essays written on two different topics designed to elicit expository essays from students in a single 45-minute class period. Please note the standard injunction for all readers: In scoring essays, we are awarding the students for what they have done well rather than searching their papers for errors for which we can penalize them.

6. Highest Score. Essays deserving of a score of 6 illustrate several characteristics of good exposition. These papers contain few serious mechanical errors: spelling, punctuation, and syntax are generally acceptable and free of error. The prose is fluid and at times even graceful. A natural structure is evident even though it is a conventional structure for the most part: the usual five-paragraph essay with a serviceable beginning, middle, and end. Examples and illustrations are appropriate and may suggest a more varied and interesting background in reading or experience. The best 6 papers rise above the conventional in structure and style, evidence of a skilled and mature writer.

5. The 5 papers are similar in most ways to the 6 papers. They show a conventional structure, usually readily apparent, as well as acceptable usage, grammar, and syntactical patterns. There are some errors, a dangling participle, vague reference, etc., but none that impede seriously the flow of thought or argument. The thesis is supported with apt illustrations, but in a thin manner when compared with the 6 papers. These papers often lack an interesting style, but they do demonstrate competence.

4. The 4 papers show evidence of organization and structure, though they may also show hesitance and struggle before they get on to a thesis. These are good papers, however, and even though mechanical and grammatical errors may distract the reader, the general subject development is strong, with useful examples and illustrations. Some of these papers may be brief, given the time allowed, and others seem to wander on and off the topic.

3. These papers show inadequate organization, with little sense of beginning, middle, or ending. It is this lack or inadequate sense of structure that distinguishes these papers from the 4 papers. The 3 papers, however, do tell a coherent story, though it may at times be repetitious or simplistic. Most of the mechanical errors are evidence of haste rather than ignorance, and they tend to accentuate or make worse a less than polished style.

2. The 2 papers are usually long enough to evaluate and are an obvious attempt to deal with the topic. The quality of the writing is below that expected of college freshmen in the beginning composition course. These papers show little if any sense of organization and development. The sentences may sound disconnected from each other, almost as if they were random thoughts or notes on the subject. The mechanics are weak.

1. The 1 papers are weaker in many respects than the 2 papers. Sometimes they are off topic and too brief to evaluate. They demonstrate that the writer is more the victim of written English than the master of it. Minimal or no control over syntax, mechanics, and development is obvious.

HOLISTIC SCORING INSTRUCTIONS

1. Study the Scoring Guide. Note that there are six score levels. The descriptions given for each level are based on ETS readings of a sample of essays of the same type that you will score. Note below that, for each score level, we give an estimate of the percentage of essays likely to be at that level. Individual readers will differ on the number of essays given specific scores, but we would not expect large differences for the estimated percentages, which are based on a sample of essays of the same type you will be reading.

Score level:	6	5	4	3	2	1
Percentage:	5%	20%	45%	20%	10%	5%

Approximate Distribution of Scores Expected

2. Read the six sample essays and score them using the Scoring Guide. After you have scored the sample essays, open the envelope containing the essays to be scored and compare your scores to the scores indicated. Please don't open the sealed envelope until you have tried to score the sample essays. If you do not agree, try to understand why before you begin scoring.

3. Begin scoring the 94 essays and recording your scores on the Holistic Score Record Sheet. Note that your essay numbers will not be in the same order as those on the scoring sheet, since each reader has a different order. Keep the essays in the order that they are in and record scores by locating the essay number on the Holistic Score Record Sheet. When you have completed scoring, all spaces on the Record Sheet should be filled.

4. When you have completed the scoring of the 94 essays, review the Scoring Guide and suggest ways in which it might be improved. Edit as you see fit and write comments on the reverse side of the Scoring Guide.

5. Place the completed Holistic Score Record Sheet, the edited scoring guide, and the 94 essays in the return envelope and send it back.

6. If you have any serious questions about these scoring procedures, please call collect to either:

Robert J. Jones (609) 734-1488
or Hunter M. Breland (609) 734-5187.

SAMPLE ESSAY SCORES

Please check your scores for the Sample Essays against the following scores assigned by other readers. Before scoring the essays in this packet, try to understand the reasons for any discrepancies between the scores you assigned to the Sample Essays and the scores assigned by other readers.

Sample Essay	Holistic Score
A	5
B	4
C	1
D	3
E	6
F	2

APPENDIX C. SCORING GUIDE AND INSTRUCTIONS, TOPIC 2

Revised 1/15/87

SCORING GUIDE

The following scoring guide is a set of generalized observations based on an analysis of the quality of writing of a set of essays written on two different topics designed to elicit expository essays from students in a single 45-minute class period. Please note the standard injunction for all readers: In scoring essays, we are awarding the students for what they have done well rather than searching their papers for errors for which we can penalize them.

6. Highest Score. Essays deserving of a score of 6 are usually strong in organization, illustration, and style and contain few serious mechanical errors. Structure is evident even though it is often conventional (i.e., the usual five-paragraph essay with a serviceable beginning, middle, and end). Examples and illustrations are appropriate and may suggest a more varied and interesting background in reading or experience. The prose is fluid and at times even graceful.

5. Essays at this level are strong in one or two of the three areas--organization, illustration, and style--but not all three. They show a conventional structure, usually readily apparent, as well as acceptable usage, grammar, and syntactical patterns. There may be some errors, but none that seriously impede the flow of thought or argument. The thesis is supported with apt illustrations, but in a thin manner when compared with the 6 papers. These papers often lack an interesting style, but they do demonstrate competence.

4. The 4 papers show evidence of adequate organization, illustration, and style--but strength in none of these. They may also show hesitance and struggle before they get on to a thesis. These are good papers even though mechanical and grammatical errors may distract the reader. Some of these papers may be brief, given the time allowed, and others seem to wander on and off the topic.

3. These papers show inadequate organization, with little sense of beginning, middle, or ending. It is this lack or inadequate sense of structure that often distinguishes these papers from the 4 papers. The 3 papers, however, do tell a coherent story, though it may at times be repetitious or simplistic. Most of the mechanical errors are evidence of haste rather than ignorance, and they tend to accentuate or make worse a less than polished style.

2. The 2 papers are usually long enough to evaluate and are an obvious attempt to deal with the topic. The quality of the writing is below that expected of college freshmen in the beginning composition course. These papers show little if any sense of organization and development. The sentences may sound disconnected from each other, almost as if they were random thoughts or notes on the subject. The mechanics are weak.

1. The 1 papers are weaker in several respects than the 2 papers. Sometimes they are off topic and too brief to evaluate. They demonstrate that the writer is more the victim of written English than the master of it. Minimal or no control over syntax, mechanics, and development is obvious.

HOLISTIC SCORING INSTRUCTIONS

1. Study the Scoring Guide. Note that there are six score levels. The descriptions given for each level are based on ETS readings of a sample of essays of the same type that you will score. Note below that, for each score level, we give an estimate of the percentage of essays likely to be at that level. Individual readers will differ on the number of essays given specific scores, but we would not expect large differences for the estimated percentages. These are based on a sample of essays of the same type you will be reading.

Score level:	6	5	4	3	2	1
Percentage:	5%	15%	40%	30%	5%	5%

2. Read the six sample essays and score them using the Scoring Guide. After you have scored the sample essays, open the envelope containing the essays to be scored and compare your scores to the scores indicated. Please don't open the sealed envelope until you have tried to score the sample essays. If you do not agree, try to understand why before you begin scoring.

3. Begin scoring the 94 essays and recording your scores on the Holistic Score Record Sheet. Note that your essay numbers will not be in the same order as those on the scoring sheet, since each reader has a different order. Keep the essays in the order that they are in and record scores by locating the essay number on the Holistic Score Record Sheet. When you have completed scoring, all spaces on the Record Sheet should be filled.

4. When you have completed the scoring of the 94 essays, review the Scoring Guide and suggest ways in which it might be improved. Edit as you see fit and write comments on the reverse side of the Scoring Guide.

5. Place the completed Holistic Score Record Sheet, the edited scoring guide, and the 94 essays in the return envelope and send it back.

6. If you have any serious questions about these scoring procedures, please call collect to either:

Robert J. Jones (609) 734-1488
or Hunter M. Breland (609) 734-5187.

APPENDIX D. SCORE RECORD SHEET

Reader: _____

HOLISTIC SCORE RECORD SHEET

Essay No.	Score	Essay No.	Score	Essay No.	Score
102-3		213-3		270-3	
105-3		214-3		271-3	
106-3		215-3		272-3	
107-3		216-3		315-3	
109-3		217-3		342-3	
110-3		218-3		357-3	
111-3		220-3		421-3	
117-3		221-3		442-3	
120-3		222-3		503-3	
121-3		223-3		510-3	
122-3		224-3		512-3	
124-3		225-3		516-3	
130-3		226-3		527-3	
131-3		229-3		528-3	
133-3		230-3		529-3	
134-3		231-3		530-3	
137-3		233-3		531-3	
139-3		234-3		540-3	
141-3		242-3		542-3	
145-3		245-3		545-3	
146-3		247-3		552-3	
152-3		252-3		557-3	
153-3		256-3		558-3	
157-3		257-3		559-3	
201-3		258-3		602-3	
205-3		259-3		609-3	
206-3		261-3		616-3	
207-3		262-3		626-3	
208-3		263-3		634-3	
209-3		264-3		638-3	
210-3		268-3		639-3	
211-3					

APPENDIX E. ANALYSIS OF VARIANCE MODEL AND RELIABILITY ESTIMATION

Analysis of Variance Model

$$Y_{str} = \mu + \alpha_s + \tau_t + \rho_r + \alpha\tau_{st} + \alpha\rho_{sr} + \tau\rho_{tr} + \epsilon_{str}$$

where:

Y_{str} is the response of subject s to topic t when read by reader r

μ is the mean response across all subjects

α_s is the random variation associated with subject s

τ_t is the random variation associated with topic t

ρ_r is the random variation associated with reader r

$\alpha\tau_{st}$ is the random variation associated with subject by topic interaction

$\alpha\rho_{sr}$ is the random variation associated with subject by reader interaction

$\tau\rho_{tr}$ is the random variation associated with topic by reader interaction

ϵ_{str} is the variation unexplained, or error

Reliability Estimation

$$r_{xx} = \frac{\sigma_\alpha^2}{\sigma_\alpha^2 + \underbrace{\sigma_\tau^2 + \sigma_{\alpha\tau}^2}_{T} + \underbrace{\sigma_\rho^2 + \sigma_{\alpha\rho}^2}_{R} + \underbrace{\sigma_{\tau\rho}^2 + \sigma_\epsilon^2}_{TR}}$$

where:

the σ^2 values are the variances associated with various sources of error;

R is the number of readers;

T is the number of topics.

Conference Scores, Original 1–3 Readers: Analysis of Variance for Dependent Variable 1

Source	Error term	Sum of squares	df	Mean square	F	Prob.	Est. of variance components
1 MEAN		8.0819592E + 3	1	8.0819592E + 3			14.32426
2 SUB		3.7454078E + 2	93	4.0273202E + 0			0.50198
3 TOP		0.1773050E − 2	1	0.1773050E − 2			− 0.00210
4 READ		0.3971631E + 0	2	0.1985816E + 0			− 0.00095
5 ST	STR	7.1831560E + 1	93	0.7723824E + 0	2.46	0.0000	0.15281
6 SR	STR	1.0360284E + 2	186	0.5570045E + 0	1.77	0.0001	0.12152
7 TR	STR	0.2695035E + 0	2	0.1347518E + 0	0.43	0.6517	− 0.00191
8 STR		5.8397163E + 1	186	0.3139632E + 0			0.31396
Grand Mean 3.78546							

Remote Scores, Readers 1–3: Analysis of Variance for Dependent Variable 1

Source	Error term	Sum of squares	df	Mean square	F	Prob.	Est. of variance components
1 MEAN		7.7968245E + 3	1	7.7968245E + 3			13.81799
2 SUB		4.0167553E + 2	93	4.3190917E + 0			0.49762
3 TOP		0.1773050E − 2	1	0.1773050E − 2			− 0.00637
4 READ		2.9680851E + 0	2	1.4840426E + 0			0.00238
5 ST	STR	1.1983156E + 2	93	1.2885114E + 0	2.67	0.0000	0.26878
6 SR	STR	9.8031915E + 1	186	0.5270533E + 0	1.09	0.2723	0.02244
7 TR	STR	1.9822695E + 0	2	0.9911348E + 0	2.06	0.1309	0.00541
8 STR		8.9684397E + 1	186	0.4821742E + 0			0.48217
Grand Mean 3.71809							

Remote Scores, Readers 4–6: Analysis of Variance for Dependent Variable 1

Source	Error term	Sum of squares	df	Mean square	F	Prob.	Est. of variance components
1 MEAN		7893.79433	1	7893.7943			13.98822
2 SUB		324.87234	93	3.4933			0.32561
3 TOP		1.39007	1	1.3901			− 0.01563
4 READ		11.81206	2	5.9060			0.00541
5 ST	STR	135.94326	93	1.4618	3.09	0.0000	0.32946
6 SR	STR	102.52128	186	0.5512	1.16	0.1501	0.03891
7 TR	STR	9.62057	2	4.8103	10.16	0.0001	0.04614
8 STR		88.04610	186	0.4734			0.47337
Grand Mean 3.74113							

Remote Scores, Readers 7–9: Analysis of Variance for Dependent Variable 1

Source	Error term	Sum of squares	df	Mean square	F	Prob.	Est. of variance components
1 MEAN		8326.04433	1	8326.0443			14.73650
2 SUB		382.78901	93	4.1160			0.43903
3 TOP		18.81028	1	18.8103			0.03176
4 READ		4.34397	2	2.1720			− 0.03681
5 ST	STR	125.35638	93	1.3479	2.97	0.0000	0.29802
6 SR	STR	109.32270	186	0.5878	1.30	0.0393	0.06696
7 TR	STR	17.91844	2	8.9592	19.74	0.0000	0.09048
8 STR		84.41489	186	0.4538			0.45384
Grand Mean 3.84220							

APPENDIX F. ORIGINAL AND CALIBRATED SCORES

Note the following score identification used in this appendix:

REX 1–2 = Remote expository score one or two.

CREX 1–2 = Calibrated remote expository score one or two.

R1–R9 = Reader 1 through 9.

Column head CREX1R5, for example, means Calibrated Remote Expository Essay 1 and the score assigned by Reader 5.

Original and Calibrated Scores REX1R1 to CREX1R5

Case	*REX1R1*	*CREX1R1*	*REX1R2*	*CREX1R2*	*REX1R3*	*CREX1R3*	*REX1R4*	*CREX1R4*	*REX1R5*	*CREX1R5*
1	3.000	3.206	2.000	2.046	2.000	2.025	4.000	4.216	3.000	3.397
2	3.000	3.206	2.000	2.046	3.000	3.025	4.000	4.216	3.000	3.397
3	1.000	1.206	1.000	1.046	1.000	1.025	1.000	1.216	1.000	1.397
4	2.000	2.206	2.000	2.046	2.000	2.025	2.000	2.216	2.000	2.397
5	1.000	1.206	1.000	1.046	1.000	1.025	2.000	2.216	1.000	1.397
6	3.000	3.206	3.000	3.046	4.000	4.025	3.000	3.216	3.000	3.397
7	3.000	3.206	2.000	2.046	2.000	2.025	1.000	1.216	2.000	2.397
8	5.000	5.206	3.000	3.046	4.000	4.025	4.000	4.216	3.000	3.397
9	6.000	6.206	4.000	4.046	4.000	4.025	2.000	2.216	3.000	3.397
10	4.000	4.206	4.000	4.046	5.000	5.025	4.000	4.216	4.000	4.397
11	4.000	4.206	3.000	3.046	4.000	4.025	3.000	3.216	4.000	4.397
12	3.000	3.206	3.000	3.046	4.000	4.025	4.000	4.216	4.000	4.397
13	4.000	4.206	3.000	3.046	3.000	3.025	2.000	2.216	5.000	5.397
14	4.000	4.206	4.000	4.046	4.000	4.025	3.000	3.216	4.000	4.397
15	3.000	3.206	3.000	3.046	4.000	4.025	4.000	4.216	4.000	4.397
16	4.000	4.206	4.000	4.046	4.000	4.025	4.000	4.216	4.000	4.397
17	4.000	4.206	4.000	4.046	4.000	4.025	3.000	3.216	5.000	5.397
18	6.000	6.206	5.000	5.046	5.000	5.025	5.000	5.216	5.000	5.397
19	3.000	3.206	3.000	3.046	4.000	4.025	3.000	3.216	4.000	4.397
20	5.000	5.206	4.000	4.046	4.000	4.025	4.000	4.216	5.000	5.397
21	4.000	4.206	5.000	5.046	3.000	3.025	5.000	5.216	4.000	4.397
22	4.000	4.206	5.000	5.046	4.000	4.025	4.000	4.216	4.000	4.397
23	1.000	1.206	1.000	1.046	2.000	2.025	1.000	1.216	1.000	1.397
24	4.000	4.206	4.000	4.046	3.000	3.025	4.000	4.216	4.000	4.397
25	6.000	6.206	6.000	6.046	4.000	4.025	6.000	6.216	5.000	5.397
26	4.000	4.206	4.000	4.046	4.000	4.025	4.000	4.216	3.000	3.397
27	2.000	2.206	3.000	3.046	3.000	3.025	2.000	2.216	2.000	2.397
28	4.000	4.206	4.000	4.046	4.000	4.025	5.000	5.216	4.000	4.397
29	3.000	3.206	3.000	3.046	3.000	3.025	4.000	4.216	3.000	3.397
30	3.000	3.206	4.000	4.046	3.000	3.025	5.000	5.216	4.000	4.397
31	4.000	4.206	5.000	5.046	6.000	6.025	5.000	5.216	5.000	5.397
32	4.000	4.206	6.000	6.046	4.000	4.025	5.000	5.216	4.000	4.397
33	5.000	5.206	5.000	5.046	5.000	5.025	5.000	5.216	5.000	5.397
34	4.000	4.206	4.000	4.046	4.000	4.025	3.000	3.216	4.000	4.397
35	4.000	4.206	5.000	5.046	5.000	5.025	6.000	6.216	5.000	5.397
36	4.000	4.206	3.000	3.046	3.000	3.025	3.000	3.216	3.000	3.397
37	2.000	2.206	4.000	4.046	2.000	2.025	4.000	4.216	2.000	2.397
38	2.000	2.206	3.000	3.046	3.000	3.025	3.000	3.216	4.000	4.397
39	4.000	4.206	4.000	4.046	4.000	4.025	4.000	4.216	4.000	4.397
40	2.000	2.206	3.000	3.046	4.000	4.025	4.000	4.216	3.000	3.397
41	4.000	4.206	5.000	5.046	2.000	2.025	4.000	4.216	2.000	2.397
42	4.000	4.206	4.000	4.046	4.000	4.025	4.000	4.216	3.000	3.397
43	4.000	4.206	4.000	4.046	3.000	3.025	3.000	3.216	4.000	4.397
44	5.000	5.206	3.000	3.046	3.000	3.025	3.000	3.216	4.000	4.397
45	3.000	3.206	4.000	4.046	4.000	4.025	4.000	4.216	3.000	3.397
46	5.000	5.206	5.000	5.046	3.000	3.025	5.000	5.216	3.000	3.397
47	5.000	5.206	6.000	6.046	6.000	6.025	6.000	6.216	6.000	6.397
48	2.000	2.206	3.000	3.046	3.000	3.025	4.000	4.216	3.000	3.397
49	4.000	4.206	4.000	4.046	5.000	5.025	4.000	4.216	3.000	3.397
50	4.000	4.206	4.000	4.046	4.000	4.025	4.000	4.216	4.000	4.397

Original and Calibrated Scores REX1R1 to CREX1R5, Continued

Case	*REX1R1*	*CREX1R1*	*REX1R2*	*CREX1R2*	*REX1R3*	*CREX1R3*	*REX1R4*	*CREX1R4*	*REX1R5*	*CREX1R5*
51	1.000	1.206	3.000	3.046	3.000	3.025	3.000	3.216	3.000	3.397
52	3.000	3.206	3.000	3.046	4.000	4.025	4.000	4.216	3.000	3.397
53	5.000	5.206	6.000	6.046	6.000	6.025	5.000	5.216	6.000	6.397
54	4.000	4.206	5.000	5.046	4.000	4.025	4.000	4.216	5.000	5.397
55	3.000	3.206	4.000	4.046	4.000	4.025	3.000	3.216	2.000	2.397
56	1.000	1.206	2.000	2.046	3.000	3.025	1.000	1.216	2.000	2.397
57	4.000	4.206	3.000	3.046	4.000	4.025	2.000	2.216	3.000	3.397
58	2.000	2.206	5.000	5.046	3.000	3.025	4.000	4.216	2.000	2.397
59	3.000	3.206	4.000	4.046	4.000	4.025	4.000	4.216	4.000	4.397
60	4.000	4.206	3.000	3.046	4.000	4.025	4.000	4.216	3.000	3.397
61	2.000	2.206	5.000	5.046	3.000	3.025	3.000	3.216	3.000	3.397
62	3.000	3.206	4.000	4.046	3.000	3.025	3.000	3.216	3.000	3.397
63	4.000	4.206	4.000	4.046	4.000	4.025	3.000	3.216	4.000	4.397
64	5.000	5.206	6.000	6.046	6.000	6.025	4.000	4.216	5.000	5.397
65	4.000	4.206	4.000	4.046	4.000	4.025	2.000	2.216	4.000	4.397
66	2.000	2.206	3.000	3.046	3.000	3.025	2.000	2.216	2.000	2.397
67	2.000	2.206	3.000	3.046	2.000	2.025	2.000	2.216	2.000	2.397
68	4.000	4.206	5.000	5.046	4.000	4.025	4.000	4.216	4.000	4.397
69	5.000	5.206	3.000	3.046	5.000	5.025	5.000	5.216	4.000	4.397
70	3.000	3.206	3.000	3.046	4.000	4.025	3.000	3.216	4.000	4.397
71	4.000	4.206	4.000	4.046	4.000	4.025	4.000	4.216	4.000	4.397
72	4.000	4.206	4.000	4.046	4.000	4.025	4.000	4.216	3.000	3.397
73	4.000	4.206	4.000	4.046	5.000	5.025	3.000	3.216	3.000	3.397
74	3.000	3.206	3.000	3.046	3.000	3.025	3.000	3.216	2.000	2.397
75	4.000	4.206	4.000	4.046	4.000	4.025	3.000	3.216	2.000	2.397
76	4.000	4.206	6.000	6.046	4.000	4.025	4.000	4.216	3.000	3.397
77	6.000	6.206	5.000	5.046	5.000	5.025	5.000	5.216	5.000	5.397
78	4.000	4.206	2.000	2.046	4.000	4.025	5.000	5.216	2.000	2.397
79	4.000	4.206	5.000	5.046	4.000	4.025	4.000	4.216	3.000	3.397
80	4.000	4.206	4.000	4.046	4.000	4.025	4.000	4.216	4.000	4.397
81	5.000	5.206	4.000	4.046	5.000	5.025	4.000	4.216	4.000	4.397
82	4.000	4.206	3.000	3.046	5.000	5.025	4.000	4.216	4.000	4.397
83	5.000	5.206	6.000	6.046	5.000	5.025	5.000	5.216	4.000	4.397
84	4.000	4.206	3.000	3.046	5.000	5.025	4.000	4.216	3.000	3.397
85	4.000	4.206	4.000	4.046	6.000	6.025	4.000	4.216	4.000	4.397
86	4.000	4.206	6.000	6.046	4.000	4.025	3.000	3.216	4.000	4.397
87	3.000	3.206	3.000	3.046	4.000	4.025	2.000	2.216	2.000	2.397
88	2.000	2.206	2.000	2.046	3.000	3.025	2.000	2.216	2.000	2.397
89	2.000	2.206	2.000	2.046	3.000	3.025	1.000	1.216	1.000	1.397
90	5.000	5.206	5.000	5.046	5.000	5.025	4.000	4.216	4.000	4.397
91	3.000	3.206	3.000	3.046	4.000	4.025	4.000	4.216	2.000	2.397
92	5.000	5.206	3.000	3.046	4.000	4.025	4.000	4.216	4.000	4.397
93	2.000	2.206	2.000	2.046	2.000	2.025	2.000	2.216	2.000	2.397
94	5.000	5.206	6.000	6.046	5.000	5.025	6.000	6.216	5.000	5.397

Original and Calibrated Scores REX1R6 to CREX1R9

Case	*REX1R6*	*CREX1R6*	*REX1R7*	*CREX1R7*	*REX1R8*	*CREX1R8*	*REX1R9*	*CREX1R9*
1	3.000	2.748	3.000	3.163	3.000	2.610	3.000	2.589
2	4.000	3.748	3.000	3.163	3.000	2.610	4.000	3.589
3	2.000	1.748	1.000	1.163	1.000	0.610	1.000	0.589
4	4.000	3.748	3.000	3.163	3.000	2.610	4.000	3.589
5	2.000	1.748	1.000	1.163	2.000	1.610	2.000	1.589
6	3.000	2.748	3.000	3.163	4.000	3.610	3.000	2.589
7	3.000	2.748	3.000	3.163	2.000	1.610	4.000	3.589
8	3.000	2.748	4.000	4.163	4.000	3.610	5.000	4.589
9	5.000	4.748	4.000	4.163	4.000	3.610	6.000	5.589
10	3.000	2.748	4.000	4.163	5.000	4.610	4.000	3.589
11	4.000	3.748	3.000	3.163	4.000	3.610	4.000	3.589
12	4.000	3.748	4.000	4.163	4.000	3.610	3.000	2.589
13	4.000	3.748	4.000	4.163	4.000	3.610	5.000	4.589
14	4.000	3.748	2.000	2.163	4.000	3.610	5.000	4.589
15	4.000	3.748	4.000	4.163	5.000	4.610	6.000	5.589
16	4.000	3.748	4.000	4.163	5.000	4.610	5.000	4.589
17	5.000	4.748	5.000	5.163	5.000	4.610	5.000	4.589
18	6.000	5.748	4.000	4.163	6.000	5.610	6.000	5.589
19	5.000	4.748	4.000	4.163	5.000	4.610	2.000	1.589
20	4.000	3.748	4.000	4.163	4.000	3.610	5.000	4.589
21	5.000	4.748	6.000	6.163	5.000	4.610	5.000	4.589
22	4.000	3.748	4.000	4.163	5.000	4.610	4.000	3.589
23	2.000	1.748	1.000	1.163	2.000	1.610	1.000	0.589
24	5.000	4.748	4.000	4.163	5.000	4.610	3.000	2.589
25	6.000	5.748	6.000	6.163	6.000	5.610	5.000	4.589
26	3.000	2.748	3.000	3.163	5.000	4.610	4.000	3.589
27	3.000	2.748	3.000	3.163	3.000	2.610	4.000	3.589
28	4.000	3.748	4.000	4.163	6.000	5.610	5.000	4.589
29	4.000	3.748	4.000	4.163	4.000	3.610	4.000	3.589
30	5.000	4.748	4.000	4.163	4.000	3.610	6.000	5.589
31	6.000	5.748	5.000	5.163	5.000	4.610	5.000	4.589
32	5.000	4.748	4.000	4.163	5.000	4.610	6.000	5.589
33	4.000	3.748	5.000	5.163	6.000	5.610	6.000	5.589
34	5.000	4.748	3.000	3.163	4.000	3.610	3.000	2.589
35	6.000	5.748	4.000	4.163	5.000	4.610	4.000	3.589
36	3.000	2.748	4.000	4.163	4.000	3.610	4.000	3.589
37	3.000	2.748	3.000	3.163	3.000	2.610	3.000	2.589
38	4.000	3.748	3.000	3.163	4.000	3.610	4.000	3.589
39	5.000	4.748	4.000	4.163	5.000	4.610	4.000	3.589
40	3.000	2.748	3.000	3.163	4.000	3.610	4.000	3.589
41	4.000	3.748	3.000	3.163	3.000	2.610	4.000	3.589
42	4.000	3.748	4.000	4.163	5.000	4.610	4.000	3.589
43	4.000	3.748	4.000	4.163	5.000	4.610	4.000	3.589
44	5.000	4.748	4.000	4.163	5.000	4.610	5.000	4.589
45	4.000	3.748	4.000	4.163	4.000	3.610	6.000	5.589
46	4.000	3.748	5.000	5.163	4.000	3.610	4.000	3.589
47	6.000	5.748	5.000	5.163	6.000	5.610	5.000	4.589
48	4.000	3.748	4.000	4.163	3.000	2.610	5.000	4.589
49	4.000	3.748	5.000	5.163	5.000	4.610	4.000	3.589
50	3.000	2.748	4.000	4.163	5.000	4.610	4.000	3.589

Original and Calibrated Scores REX1R6 to CREX1R9, Continued

Case	*REX1R6*	*CREX1R6*	*REX1R7*	*CREX1R7*	*REX1R8*	*CREX1R8*	*REX1R9*	*CREX1R9*
51	4.000	3.748	2.000	2.163	3.000	2.610	3.000	2.589
52	3.000	2.748	4.000	4.163	4.000	3.610	4.000	3.589
53	6.000	5.748	6.000	6.163	4.000	3.610	6.000	5.589
54	5.000	4.748	4.000	4.163	4.000	3.610	5.000	4.589
55	3.000	2.748	3.000	3.163	4.000	3.610	4.000	3.589
56	4.000	3.748	3.000	3.163	4.000	3.610	3.000	2.589
57	5.000	4.748	4.000	4.163	4.000	3.610	4.000	3.589
58	4.000	3.748	3.000	3.163	3.000	2.610	4.000	3.589
59	4.000	3.748	5.000	5.163	4.000	3.610	4.000	3.589
60	3.000	2.748	4.000	4.163	4.000	3.610	4.000	3.589
61	4.000	3.748	5.000	5.163	3.000	2.610	4.000	3.589
62	4.000	3.748	4.000	4.163	3.000	2.610	4.000	3.589
63	4.000	3.748	3.000	3.163	4.000	3.610	4.000	3.589
64	6.000	5.748	4.000	4.163	6.000	5.610	6.000	5.589
65	3.000	2.748	3.000	3.163	4.000	3.610	5.000	4.589
66	4.000	3.748	3.000	3.163	4.000	3.610	4.000	3.589
67	2.000	1.748	1.000	1.163	3.000	2.610	3.000	2.589
68	4.000	3.748	3.000	3.163	4.000	3.610	4.000	3.589
69	4.000	3.748	4.000	4.163	5.000	4.610	5.000	4.589
70	4.000	3.748	3.000	3.163	4.000	3.610	4.000	3.589
71	5.000	4.748	3.000	3.163	4.000	3.610	5.000	4.589
72	4.000	3.748	3.000	3.163	4.000	3.610	4.000	3.589
73	4.000	3.748	4.000	4.163	6.000	5.610	5.000	4.589
74	3.000	2.748	2.000	2.163	3.000	2.610	3.000	2.589
75	4.000	3.748	5.000	5.163	4.000	3.610	4.000	3.589
76	5.000	4.748	4.000	4.163	6.000	5.610	5.000	4.589
77	5.000	4.748	5.000	5.163	6.000	5.610	5.000	4.589
78	3.000	2.748	2.000	2.163	3.000	2.610	4.000	3.589
79	5.000	4.748	4.000	4.163	5.000	4.610	6.000	5.589
80	4.000	3.748	4.000	4.163	4.000	3.610	4.000	3.589
81	4.000	3.748	4.000	4.163	6.000	5.610	4.000	3.589
82	3.000	2.748	4.000	4.163	4.000	3.610	5.000	4.589
83	4.000	3.748	4.000	4.163	5.000	4.610	4.000	3.589
84	5.000	4.748	3.000	3.163	4.000	3.610	5.000	4.589
85	4.000	3.748	5.000	5.163	5.000	4.610	5.000	4.589
86	4.000	3.748	3.000	3.163	5.000	4.610	3.000	2.589
87	5.000	4.748	4.000	4.163	4.000	3.610	4.000	3.589
88	2.000	1.748	3.000	3.163	2.000	1.610	4.000	3.589
89	3.000	2.748	1.000	1.163	3.000	2.610	2.000	1.589
90	5.000	4.748	6.000	6.163	6.000	5.610	6.000	5.589
91	5.000	4.748	4.000	4.163	5.000	4.610	3.000	2.589
92	4.000	3.748	3.000	3.163	4.000	3.610	4.000	3.589
93	3.000	2.748	2.000	2.163	2.000	1.610	2.000	1.589
94	6.000	5.748	4.000	4.163	5.000	4.610	6.000	5.589

Original and Calibrated Scores REX2R1 to CREX2R5

Case	*REX2R1*	*CREX2R1*	*REX2R2*	*CREX2R2*	*REX2R3*	*CREX2R3*	*REX2R4*	*CREX2R4*	*REX2R5*	*CREX2R5*
1	3.0000	3.0520	2.0000	1.8600	3.0000	3.1050	3.0000	2.8920	3.0000	2.9770
2	2.0000	2.0520	2.0000	2.8600	3.0000	3.1050	4.0000	3.8920	2.0000	1.9770
3	1.0000	1.0520	1.0000	0.8600	1.0000	1.1050	1.0000	0.8920	2.0000	1.9770
4	2.0000	2.0520	2.0000	3.8600	3.0000	3.1050	3.0000	2.8920	2.0000	1.9770
5	1.0000	1.0520	1.0000	2.8600	1.0000	1.1050	2.0000	1.8920	3.0000	2.9770
6	2.0000	2.0520	3.0000	3.8600	3.0000	3.1050	3.0000	2.8920	3.0000	2.9770
7	3.0000	3.0520	2.0000	2.8600	2.0000	2.1050	4.0000	3.8920	3.0000	2.9770
8	4.0000	4.0520	3.0000	4.8600	4.0000	4.1050	4.0000	3.8920	4.0000	3.9770
9	3.0000	3.0520	4.0000	3.8600	3.0000	3.1050	5.0000	4.8920	5.0000	4.9770
10	2.0000	2.0520	4.0000	0.8600	2.0000	2.1050	1.0000	0.8920	3.0000	2.9770
11	2.0000	2.0520	3.0000	2.8600	3.0000	3.1050	4.0000	3.8920	3.0000	2.9770
12	3.0000	3.0520	3.0000	3.8600	3.0000	3.1050	4.0000	3.8920	4.0000	3.9770
13	3.0000	3.0520	3.0000	4.8600	3.0000	3.1050	4.0000	3.8920	4.0000	3.9770
14	4.0000	4.0520	4.0000	3.8600	4.0000	4.1050	4.0000	3.8920	5.0000	4.9770
15	3.0000	3.0520	3.0000	3.8600	4.0000	4.1050	4.0000	3.8920	4.0000	3.9770
16	4.0000	4.0520	4.0000	3.8600	5.0000	5.1050	4.0000	3.8920	4.0000	3.9770
17	4.0000	4.0520	4.0000	3.8600	3.0000	3.1050	5.0000	4.8920	4.0000	3.9770
18	4.0000	4.0520	5.0000	5.8600	5.0000	5.1050	5.0000	4.8920	6.0000	5.9770
19	4.0000	4.0520	3.0000	4.8600	4.0000	4.1050	4.0000	3.8920	6.0000	5.9770
20	4.0000	4.0520	4.0000	3.8600	3.0000	3.1050	4.0000	3.8920	4.0000	3.9770
21	3.0000	3.0520	5.0000	2.8600	4.0000	4.1050	3.0000	2.8920	3.0000	2.9770
22	4.0000	4.0520	5.0000	4.8600	5.0000	5.1050	4.0000	3.8920	4.0000	3.9770
23	1.0000	1.0520	1.0000	1.8600	1.0000	1.1050	3.0000	2.8920	1.0000	0.9770
24	2.0000	2.0520	4.0000	3.8600	3.0000	3.1050	4.0000	3.8920	4.0000	3.9770
25	4.0000	4.0520	6.0000	4.8600	6.0000	6.1050	5.0000	4.8920	6.0000	5.9770
26	5.0000	5.0520	4.0000	3.8600	6.0000	6.1050	6.0000	5.8920	5.0000	4.9770
27	3.0000	3.0520	3.0000	3.8600	4.0000	4.1050	3.0000	2.8920	4.0000	3.9770
28	3.0000	3.0520	4.0000	3.8600	4.0000	4.1050	4.0000	3.8920	4.0000	3.9770
29	5.0000	5.0520	3.0000	4.8600	4.0000	4.1050	4.0000	3.8920	5.0000	4.9770
30	6.0000	6.0520	4.0000	5.8600	6.0000	6.1050	5.0000	4.8920	4.0000	3.9770
31	5.0000	5.0520	5.0000	5.8600	4.0000	4.1050	5.0000	4.8920	5.0000	4.9770
32	6.0000	6.0520	6.0000	4.8600	4.0000	4.1050	5.0000	4.8920	5.0000	4.9770
33	5.0000	5.0520	5.0000	5.8600	5.0000	5.1050	4.0000	3.8920	4.0000	3.9770
34	4.0000	4.0520	4.0000	3.8600	6.0000	6.1050	3.0000	2.8920	4.0000	3.9770
35	4.0000	4.0520	5.0000	3.8600	4.0000	4.1050	3.0000	2.8920	4.0000	3.9770
36	5.0000	5.0520	3.0000	4.8600	4.0000	4.1050	5.0000	4.8920	5.0000	4.9770
37	3.0000	3.0520	4.0000	2.8600	3.0000	3.1050	3.0000	2.8920	3.0000	2.9770
38	4.0000	4.0520	3.0000	3.8600	3.0000	3.1050	4.0000	3.8920	4.0000	3.9770
39	4.0000	4.0520	4.0000	3.8600	3.0000	3.1050	4.0000	3.8920	4.0000	3.9770
40	3.0000	3.0520	3.0000	2.8600	3.0000	3.1050	3.0000	2.8920	4.0000	3.9770
41	3.0000	3.0520	5.0000	2.8600	3.0000	3.1050	4.0000	3.8920	3.0000	2.9770
42	3.0000	3.0520	4.0000	2.8600	4.0000	4.1050	4.0000	3.8920	3.0000	2.9770
43	6.0000	6.0520	4.0000	4.8600	4.0000	4.1050	4.0000	3.8920	5.0000	4.9770
44	4.0000	4.0520	3.0000	2.8600	4.0000	4.1050	3.0000	2.8920	3.0000	2.9770
45	4.0000	4.0520	4.0000	3.8600	4.0000	4.1050	4.0000	3.8920	4.0000	3.9770
46	5.0000	5.0520	5.0000	3.8600	4.0000	4.1050	4.0000	3.8920	4.0000	3.9770
47	4.0000	4.0520	6.0000	4.8600	5.0000	5.1050	4.0000	3.8920	5.0000	4.9770
48	3.0000	3.0520	3.0000	2.8600	4.0000	4.1050	4.0000	3.8920	4.0000	3.9770
49	3.0000	3.0520	4.0000	3.8600	4.0000	4.1050	3.0000	2.8920	4.0000	3.9770
50	4.0000	4.0520	4.0000	3.8600	4.0000	4.1050	5.0000	4.8920	4.0000	3.9770

Original and Calibrated Scores REX2R1 to CREX2R5, Continued

Case	*REX2R1*	*CREX2R1*	*REX2R2*	*CREX2R2*	*REX2R3*	*CREX2R3*	*REX2R4*	*CREX2R4*	*REX2R5*	*CREX2R5*
51	3.0000	3.0520	3.0000	3.8600	4.0000	4.1050	3.0000	2.8920	4.0000	3.9770
52	5.0000	5.0520	3.0000	4.8600	4.0000	4.1050	5.0000	4.8920	4.0000	3.9770
53	4.0000	4.0520	6.0000	2.8600	4.0000	4.1050	2.0000	1.8920	2.0000	1.9770
54	6.0000	6.0520	5.0000	4.8600	4.0000	4.1050	5.0000	4.8920	5.0000	4.9770
55	5.0000	5.0520	4.0000	3.8600	4.0000	4.1050	4.0000	3.8920	4.0000	3.9770
56	4.0000	4.0520	2.0000	3.8600	4.0000	4.1050	3.0000	2.8920	4.0000	3.9770
57	5.0000	5.0520	3.0000	2.8600	4.0000	4.1050	5.0000	4.8920	4.0000	3.9770
58	4.0000	4.0520	5.0000	4.8600	5.0000	5.1050	6.0000	5.8920	4.0000	3.9770
59	4.0000	4.0520	4.0000	3.8600	2.0000	2.1050	4.0000	3.8920	5.0000	4.9770
60	4.0000	4.0520	3.0000	3.8600	2.0000	2.1050	4.0000	3.8920	6.0000	5.9770
61	4.0000	4.0520	5.0000	3.8600	4.0000	4.1050	5.0000	4.8920	6.0000	5.9770
62	3.0000	3.0520	4.0000	2.8600	3.0000	3.1050	4.0000	3.8920	4.0000	3.9770
63	5.0000	5.0520	4.0000	4.8600	4.0000	4.1050	6.0000	5.8920	5.0000	4.9770
64	4.0000	4.0520	6.0000	3.8600	5.0000	5.1050	5.0000	4.8920	5.0000	4.9770
65	5.0000	5.0520	4.0000	2.8600	4.0000	4.1050	3.0000	2.8920	3.0000	2.9770
66	4.0000	4.0520	3.0000	4.8600	4.0000	4.1050	5.0000	4.8920	4.0000	3.9770
67	3.0000	3.0520	3.0000	2.8600	3.0000	3.1050	3.0000	2.8920	3.0000	2.9770
68	4.0000	4.0520	5.0000	4.8600	3.0000	3.1050	4.0000	3.8920	4.0000	3.9770
69	3.0000	3.0520	3.0000	2.8600	3.0000	3.1050	2.0000	1.8920	3.0000	2.9770
70	3.0000	3.0520	3.0000	2.8600	2.0000	2.1050	4.0000	3.8920	4.0000	3.9770
71	3.0000	3.0520	4.0000	1.8600	3.0000	3.1050	3.0000	2.8920	3.0000	2.9770
72	2.0000	2.0520	4.0000	2.8600	3.0000	3.1050	4.0000	3.8920	4.0000	3.9770
73	4.0000	4.0520	4.0000	4.8600	2.0000	2.1050	6.0000	5.8920	4.0000	3.9770
74	3.0000	3.0520	3.0000	1.8600	2.0000	2.1050	3.0000	2.8920	3.0000	2.9770
75	4.0000	4.0520	4.0000	4.8600	2.0000	2.1050	4.0000	3.8920	3.0000	2.9770
76	5.0000	5.0520	6.0000	5.8600	3.0000	3.1050	5.0000	4.8920	3.0000	2.9770
77	3.0000	3.0520	5.0000	3.8600	4.0000	4.1050	3.0000	2.8920	5.0000	4.9770
78	4.0000	4.0520	2.0000	2.8600	4.0000	4.1050	4.0000	3.8920	4.0000	3.9770
79	4.0000	4.0520	5.0000	3.8600	4.0000	4.1050	5.0000	4.8920	4.0000	3.9770
80	4.0000	4.0520	4.0000	3.8600	5.0000	5.1050	6.0000	5.8920	4.0000	3.9770
81	5.0000	5.0520	4.0000	3.8600	5.0000	5.1050	3.0000	2.8920	4.0000	3.9770
82	3.0000	3.0520	3.0000	1.8600	5.0000	5.1050	1.0000	0.8920	2.0000	1.9770
83	4.0000	4.0520	6.0000	3.8600	5.0000	5.1050	4.0000	3.8920	4.0000	3.9770
84	4.0000	4.0520	3.0000	4.8600	5.0000	5.1050	4.0000	3.8920	3.0000	2.9770
85	3.0000	3.0520	4.0000	2.8600	4.0000	4.1050	4.0000	3.8920	3.0000	2.9770
86	5.0000	5.0520	6.0000	4.8600	4.0000	4.1050	4.0000	3.8920	3.0000	2.9770
87	3.0000	3.0520	3.0000	2.8600	4.0000	4.1050	4.0000	3.8920	4.0000	3.9770
88	3.0000	3.0520	2.0000	2.8600	1.0000	1.1050	3.0000	2.8920	2.0000	1.9770
89	2.0000	2.0520	2.0000	1.8600	1.0000	1.1050	2.0000	1.8920	1.0000	0.9770
90	4.0000	4.0520	5.0000	4.8600	4.0000	4.1050	3.0000	2.8920	3.0000	2.9770
91	3.0000	3.0520	3.0000	1.8600	1.0000	1.1050	2.0000	1.8920	1.0000	0.9770
92	4.0000	4.0520	3.0000	2.8600	4.0000	4.1050	4.0000	3.8920	3.0000	2.9770
93	4.0000	4.0520	2.0000	3.8600	5.0000	5.1050	3.0000	2.8920	2.0000	1.9770
94	4.0000	4.0520	6.0000	3.8600	4.0000	4.1050	3.0000	2.8920	2.0000	1.9770

Original and Calibrated Scores REX2R6 to CREX2R9

Case	*REX2R6*	*CREX2R6*	*REX2R7*	*CREX2R7*	*REX2R8*	*CREX2R8*	*REX2R9*	*CREX2R9*
1	3.0000	2.9240	3.0000	2.9350	3.0000	3.1160	3.0000	3.1370
2	3.0000	2.9240	4.0000	3.9350	2.0000	2.1160	5.0000	5.1370
3	3.0000	2.9240	2.0000	1.9350	1.0000	1.1160	3.0000	3.1370
4	5.0000	4.9240	3.0000	2.9350	2.0000	2.1160	3.0000	3.1370
5	2.0000	1.9240	2.0000	1.9350	1.0000	1.1160	2.0000	2.1370
6	3.0000	2.9240	3.0000	2.9350	2.0000	2.1160	3.0000	3.1370
7	3.0000	2.9240	2.0000	1.9350	2.0000	2.1160	4.0000	4.1370
8	5.0000	4.9240	4.0000	3.9350	4.0000	4.1160	5.0000	5.1370
9	5.0000	4.9240	4.0000	3.9350	3.0000	3.1160	6.0000	6.1370
10	3.0000	2.9240	4.0000	3.9350	3.0000	3.1160	1.0000	1.1370
11	4.0000	3.9240	3.0000	2.9350	4.0000	4.1160	4.0000	4.1370
12	6.0000	5.9240	5.0000	4.9350	4.0000	4.1160	6.0000	6.1370
13	5.0000	4.9240	4.0000	3.9350	4.0000	4.1160	4.0000	4.1370
14	6.0000	5.9240	5.0000	4.9350	5.0000	5.1160	3.0000	3.1370
15	4.0000	3.9240	4.0000	3.9350	4.0000	4.1160	2.0000	2.1370
16	5.0000	4.9240	5.0000	4.9350	5.0000	5.1160	6.0000	6.1370
17	4.0000	3.9240	3.0000	2.9350	4.0000	4.1160	5.0000	5.1370
18	5.0000	4.9240	4.0000	3.9350	5.0000	5.1160	4.0000	4.1370
19	5.0000	4.9240	5.0000	4.9350	4.0000	4.1160	5.0000	5.1370
20	3.0000	2.9240	3.0000	2.9350	3.0000	3.1160	3.0000	3.1370
21	4.0000	3.9240	5.0000	4.9350	3.0000	3.1160	5.0000	5.1370
22	4.0000	3.9240	4.0000	3.9350	4.0000	4.1160	4.0000	4.1370
23	3.0000	2.9240	2.0000	1.9350	2.0000	2.1160	1.0000	1.1370
24	4.0000	3.9240	4.0000	3.9350	2.0000	2.1160	3.0000	3.1370
25	6.0000	5.9240	6.0000	5.9350	5.0000	5.1160	5.0000	5.1370
26	5.0000	4.9240	6.0000	5.9350	5.0000	5.1160	5.0000	5.1370
27	5.0000	4.9240	4.0000	3.9350	4.0000	4.1160	5.0000	5.1370
28	4.0000	3.9240	5.0000	4.9350	4.0000	4.1160	4.0000	4.1370
29	4.0000	3.9240	4.0000	3.9350	4.0000	4.1160	4.0000	4.1370
30	5.0000	4.9240	4.0000	3.9350	4.0000	4.1160	5.0000	5.1370
31	5.0000	4.9240	6.0000	5.9350	5.0000	5.1160	5.0000	5.1370
32	4.0000	3.9240	4.0000	3.9350	4.0000	4.1160	6.0000	6.1370
33	4.0000	3.9240	4.0000	3.9350	6.0000	6.1160	4.0000	4.1370
34	4.0000	3.9240	4.0000	3.9350	4.0000	4.1160	3.0000	3.1370
35	3.0000	2.9240	4.0000	3.9350	3.0000	3.1160	3.0000	3.1370
36	5.0000	4.9240	4.0000	3.9350	4.0000	4.1160	6.0000	6.1370
37	4.0000	3.9240	4.0000	3.9350	3.0000	3.1160	4.0000	4.1370
38	4.0000	3.9240	3.0000	2.9350	3.0000	3.1160	4.0000	4.1370
39	4.0000	3.9240	3.0000	2.9350	4.0000	4.1160	4.0000	4.1370
40	3.0000	2.9240	3.0000	2.9350	3.0000	3.1160	2.0000	2.1370
41	3.0000	2.9240	2.0000	1.9350	3.0000	3.1160	3.0000	3.1370
42	4.0000	3.9240	4.0000	3.9350	5.0000	5.1160	4.0000	4.1370
43	5.0000	4.9240	4.0000	3.9350	5.0000	5.1160	4.0000	4.1370
44	4.0000	3.9240	4.0000	3.9350	4.0000	4.1160	3.0000	3.1370
45	4.0000	3.9240	5.0000	4.9350	4.0000	4.1160	5.0000	5.1370
46	5.0000	4.9240	5.0000	4.9350	4.0000	4.1160	6.0000	6.1370
47	6.0000	5.9240	5.0000	4.9350	5.0000	5.1160	4.0000	4.1370
48	4.0000	3.9240	5.0000	4.9350	3.0000	3.1160	4.0000	4.1370
49	3.0000	2.9240	4.0000	3.9350	3.0000	3.1160	4.0000	4.1370
50	4.0000	3.9240	5.0000	4.9350	4.0000	4.1160	4.0000	4.1370

Original and Calibrated Scores REX2R6 to CREX2R9, Continued

Case	*REX2R6*	*CREX2R6*	*REX2R7*	*CREX2R7*	*REX2R8*	*CREX2R8*	*REX2R9*	*CREX2R9*
51	4.0000	3.9240	4.0000	3.9350	2.0000	2.1160	3.0000	3.1370
52	3.0000	2.9240	6.0000	5.9350	5.0000	5.1160	4.0000	4.1370
53	4.0000	3.9240	2.0000	1.9350	3.0000	3.1160	1.0000	1.1370
54	4.0000	3.9240	4.0000	3.9350	4.0000	4.1160	4.0000	4.1370
55	3.0000	2.9240	4.0000	3.9350	4.0000	4.1160	5.0000	5.1370
56	3.0000	2.9240	4.0000	3.9350	4.0000	4.1160	4.0000	4.1370
57	4.0000	3.9240	4.0000	3.9350	3.0000	3.1160	3.0000	3.1370
58	2.0000	1.9240	4.0000	3.9350	3.0000	3.1160	4.0000	4.1370
59	4.0000	3.9240	6.0000	5.9350	5.0000	5.1160	4.0000	4.1370
60	3.0000	2.9240	5.0000	4.9350	4.0000	4.1160	4.0000	4.1370
61	4.0000	3.9240	4.0000	3.9350	4.0000	4.1160	4.0000	4.1370
62	3.0000	2.9240	3.0000	2.9350	2.0000	2.1160	4.0000	4.1370
63	4.0000	3.9240	5.0000	4.9350	4.0000	4.1160	4.0000	4.1370
64	4.0000	3.9240	4.0000	3.9350	6.0000	6.1160	4.0000	4.1370
65	2.0000	1.9240	3.0000	2.9350	4.0000	4.1160	4.0000	4.1370
66	3.0000	2.9240	3.0000	2.9350	4.0000	4.1160	3.0000	3.1370
67	3.0000	2.9240	3.0000	2.9350	4.0000	4.1160	3.0000	3.1370
68	4.0000	3.9240	4.0000	3.9350	5.0000	5.1160	4.0000	4.1370
69	4.0000	3.9240	4.0000	3.9350	4.0000	4.1160	2.0000	2.1370
70	4.0000	3.9240	3.0000	2.9350	3.0000	3.1160	3.0000	3.1370
71	3.0000	2.9240	3.0000	2.9350	3.0000	3.1160	2.0000	2.1370
72	3.0000	2.9240	3.0000	2.9350	2.0000	2.1160	1.0000	1.1370
73	4.0000	3.9240	4.0000	3.9350	5.0000	5.1160	4.0000	4.1370
74	4.0000	3.9240	2.0000	1.9350	3.0000	3.1160	3.0000	3.1370
75	5.0000	4.9240	3.0000	2.9350	4.0000	4.1160	2.0000	2.1370
76	6.0000	5.9240	5.0000	4.9350	5.0000	5.1160	4.0000	4.1370
77	4.0000	3.9240	5.0000	4.9350	4.0000	4.1160	3.0000	3.1370
78	5.0000	4.9240	4.0000	3.9350	3.0000	3.1160	2.0000	2.1370
79	4.0000	3.9240	4.0000	3.9350	4.0000	4.1160	3.0000	3.1370
80	3.0000	2.9240	4.0000	3.9350	4.0000	4.1160	3.0000	3.1370
81	4.0000	3.9240	5.0000	4.9350	6.0000	6.1160	4.0000	4.1370
82	1.0000	0.9240	3.0000	2.9350	2.0000	2.1160	1.0000	1.1370
83	4.0000	3.9240	4.0000	3.9350	5.0000	5.1160	5.0000	5.1370
84	3.0000	2.9240	4.0000	3.9350	4.0000	4.1160	3.0000	3.1370
85	2.0000	1.9240	2.0000	1.9350	4.0000	4.1160	4.0000	4.1370
86	3.0000	2.9240	4.0000	3.9350	3.0000	3.1160	5.0000	5.1370
87	4.0000	3.9240	3.0000	2.9350	4.0000	4.1160	3.0000	3.1370
88	1.0000	0.9240	3.0000	2.9350	1.0000	1.1160	1.0000	1.1370
89	2.0000	1.9240	1.0000	0.9350	2.0000	2.1160	1.0000	1.1370
90	4.0000	3.9240	3.0000	2.9350	3.0000	3.1160	2.0000	2.1370
91	2.0000	1.9240	1.0000	0.9350	1.0000	1.1160	1.0000	1.1370
92	3.0000	2.9240	3.0000	2.9350	3.0000	3.1160	3.0000	3.1370
93	3.0000	2.9240	3.0000	2.9350	3.0000	3.1160	3.0000	3.1370
94	3.0000	2.9240	3.0000	2.9350	3.0000	3.1160	3.0000	3.1370